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A. I. A. FILE No. 30 D11

MASSACHUSETTS

UNIT HEATERS

TYPE "H"



ENGINEERS DATA
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MASSACHUSETTS BLOWER DIVISION
of
THE BISHOP & BABCOCK SALES CO.
General Offices - 4901-4915 Hamilton Ave. N.E.
CLEVELAND, OHIO.

A. I. A. FILE No. 30 D11

MASSACHUSETTS

Massachusetts Type "H" Unit Heaters



Rear View



18 Inch Type "H" Unit Heater

Front View

For installations where floor space is not available, we recommend Massachusetts Type H Unit Heaters, arranged for ceiling suspension. These units are built in three sizes 18", 24" and 30" and can be furnished with deflectors and recirculating boxes if required.

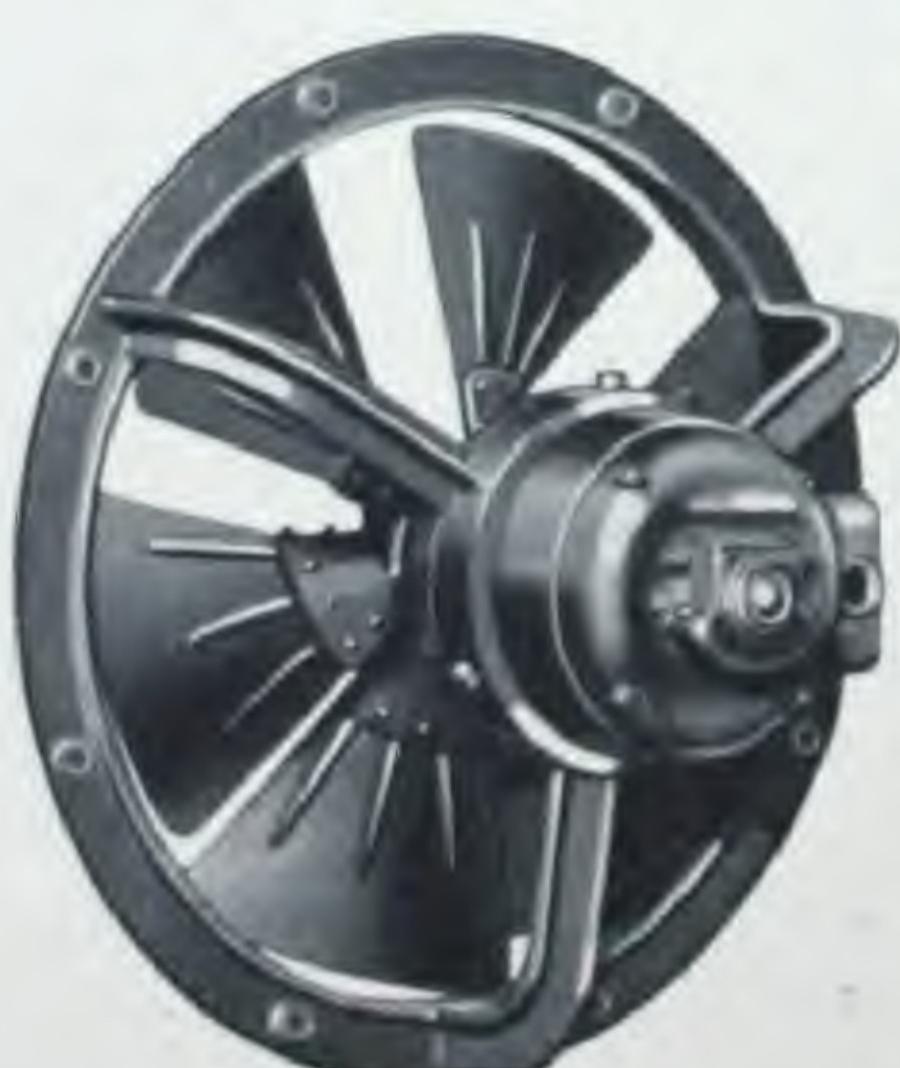
Numerous innovations in design and performance have been incorporated in these units which appeal to the engineering fraternity.

The heater casing is so designed that an air space or plenum is made between the fan and heater section insuring a uniform velocity over the entire heater surface eliminating high velocity points and dead pockets usually found in units where the fans are set directly against the heating medium.

The Propeller Fans used in all Massachusetts Type H Unit Heaters represent a design recognized for its ability to produce larger and more uniform air displacement with less power consumption and quieter operation.

The Fan and motor are mounted in a rigid tripod of close grain grey iron which in turn is securely bolted to the heater casing.

Motors furnished are totally enclosed, automatically lubricated ball bearings, and are sufficiently large to run continuously under any conditions without ventilation, insuring against dust and fumes of factory processes entering and injuring the motor. With single phase alternating current units, condenser type motors are furnished insuring quiet operation and efficiency not to be found in the Repulsion-Induc-



Fan and Motor Assembly

MASSACHUSETTS

tion and Split Phase types of motors. Three speed switches can be furnished with condenser motors when desired.

Heating Coils:

The heating elements used in all Massachusetts Type H Unit Heaters are high pressure B & B Copper Fin Radiation, and are furnished two and three tubes deep and in one or two sections depending on the size of the heater and the requirements of the particular installation.



B & B Heating Coil

The heater consists of $\frac{3}{4}$ " copper tubes, each tube is wrapped with a thin copper radial fin $1\frac{1}{2}$ " outside diameter. These fins which are tinned to the tubes to insure a perfect bond, are of proper width to give maximum heat transfer with a minimum tube spacing, and the spacing of the fins are such as to give a maximum surface without undue air resistance.

The tubes are mounted between heavy brass tube sheets and fused into holes in these sheets to insure leak-proof joints under all operating conditions.

The headers are of close grain cast iron; the return header having an eccentric tapping to prevent accumulation of condensate in the heater section.

The heater sections are designed to operate on steam pressures up to 125 pounds per square inch, and each section is subjected to a 250 pound per square inch hydrostatic test before being assembled into the casing.



Rear View



Front View

24 Inch Type H Unit Heater

The heater casings, both inside and out, are finished in two coats of high grade olive green lacquer. The fan wheels are given two coats of special paint of contrasting color, which resists the wearing action of the air passing through the fan.

The B&B Line

MASSACHUSETTS

The performance and efficiency of Massachusetts Type H Unit Heaters can be increased when installed in conjunction with Recirculating boxes by means of which it is possible to more nearly approach the highly efficient performance of the Type V or floor mounted units.

With recirculating boxes the cool strata of air is taken from a point just above the floor level, drawn up through the vertical recirculating box and discharged above the breathing zone in a horizontal plane. This insures uniform, efficient heating, and prevents overheating in the upper areas.

The use of recirculating boxes is especially desirable where there is considerable height to the building to be heated as there is a much smaller difference between temperatures at the ceiling and floor when this method is used.

Massachusetts recirculating boxes are constructed of heavy blue annealed steel sheets reinforced with a frame of angle iron. They are equipped with doors fitted with latches and hinges which permits inspection of the motor.

Massachusetts Type H Unit Heaters can be arranged for ventilating as well as heating by means of a fresh air intake box fitted with dampers allowing any portion of the air to be recirculated or drawn from out of doors as desired.



Type H Unit Heater with
Louvre Deflectors



Type H Unit Heater
Floor type with recir-
culating box

Where the use of a recirculating box is precluded due to lack of floor space, and the units must be hung high above the floor, deflectors are often used to direct the air downward. Adjustable louvre deflectors, which may be regulated as to the angle of discharge, can be had for all Type H Unit Heaters.

Large mesh grilles of heavy wire, which cover the entire face of the heater, protecting the tubes of the heating element from damage, can be furnished when desired.

MASSACHUSETTS



Rear View



Front View

30 Inch Type H Unit Heater

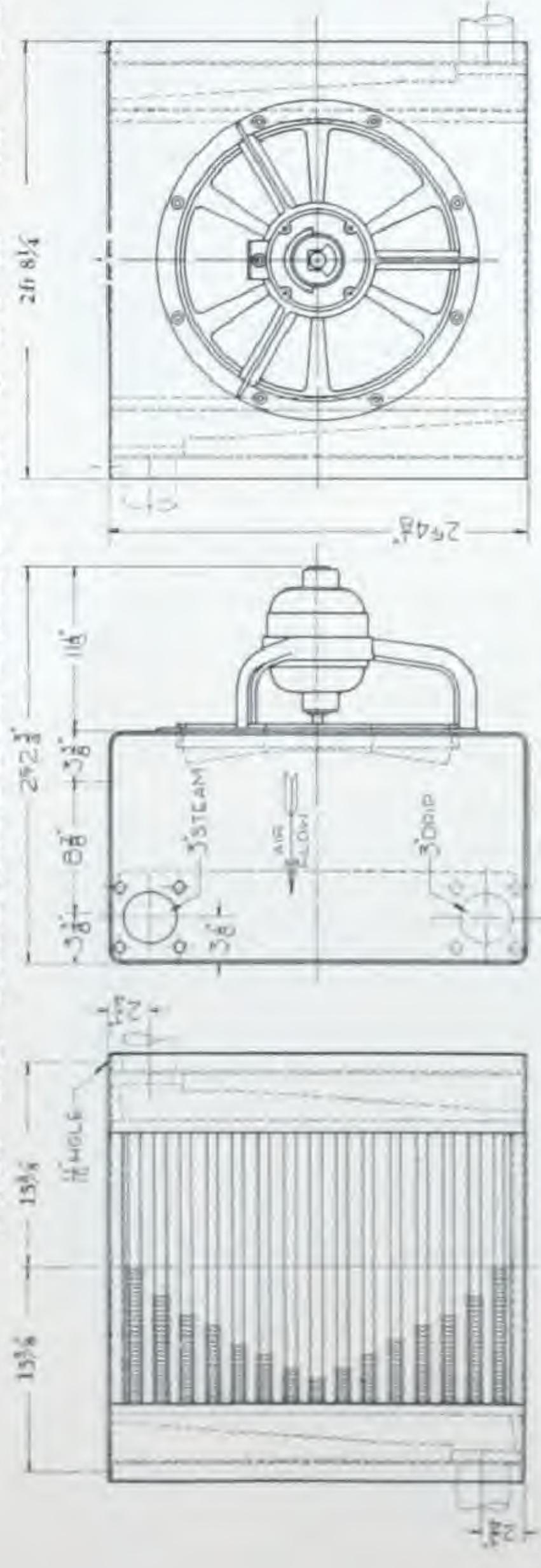
The location of unit heaters plays such an important part in the efficient performance and results obtained that every consideration should be given this feature. Bishop & Babcock Engineers are available for laying out the unit heating system; this service without charge or obligation.



Plan of Typical Small Manufacturing Plant Heated and Ventilated by
Massachusetts Type "H" Unit Heater

The B&B Line

No. 18 MASSACHUSETTS TYPE "H" UNIT HEATERS



SPECIFICATIONS

FAN.—18" Design 5 Massachusetts Electric Propeller Fan.

MOTOR.—Totally enclosed round frame, ball bearing motor. Single phase units furnished with condenser type motors.

HEATER.—No. 22 High Pressure B. & B. Heater Sections— $\frac{3}{4}$ " copper tubes and $1\frac{1}{2}$ " copper fins, all tinned, the former welded into drilled holes in the brass tube sheets. Headers of close grained cast iron.

All heaters are designed for 125 pounds steam working pressure, and are tested at 250 pounds hydrostatic pressure.

Linear feet of tubing:—2-Row—53 feet;
3-Row—81 feet.

Enter- ing Air Temp.	HEATER Number of tubes deep	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condens- ation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condens- ation lbs.perhour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condens- ation lbs.perhour	Equiv. Rad. sq. ft.
H. 07	2 Rows	3440	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	105 110.5 115	125620 96520 80510	129.5 99.5 83	525 403 333	111.5 118.5 124	149460 114720 95200	157 120.5 100	625 480 398	130 141 149	215900 165840 137680	241.5 185.5 154	899 690 572
		3200	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	120 128 133	166540 126100 101850	172 130 105	696 526 425	124 139.5 145.5	198020 149940 121380	208 157.5 127.5	826 627 509	157.5 172 182	286530 216350 175220	320.5 242 196	1190 900 730
H. 08	3 Rows	3440	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	108 115 120	138240 106560 88320	144 111 92	576 444 368	118.5 126.5 133	172140 132490 122880	184.5 142 117.5	719 552 457	137.5 149.5 158.5	239570 184020 152770	276 212 176	1000 769 636
		3200	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	125 134 139.5	183840 139200 112320	191.5 145 117	765 580 469	139 150.5 158	228590 172610 139950	245 185 150	955 721 584	168.5 185 195	318120 240440 194870	366.5 277 224.5	1328 1007 811
H. 09	2 Rows	3440	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	108 115 120	138240 106560 88320	144 111 92	576 444 368	118.5 126.5 133	172140 132490 122880	184.5 142 117.5	719 552 457	137.5 149.5 158.5	239570 184020 152770	276 212 176	1000 769 636
		3200	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	125 134 139.5	183840 139200 112320	191.5 145 117	765 580 469	139 150.5 158	228590 172610 139950	245 185 150	955 721 584	168.5 185 195	318120 240440 194870	366.5 277 224.5	1328 1007 811
H. 10	3 Rows	3440	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	108 115 120	138240 106560 88320	144 111 92	576 444 368	118.5 126.5 133	172140 132490 122880	184.5 142 117.5	719 552 457	137.5 149.5 158.5	239570 184020 152770	276 212 176	1000 769 636
		3200	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	125 134 139.5	183840 139200 112320	191.5 145 117	765 580 469	139 150.5 158	228590 172610 139950	245 185 150	955 721 584	168.5 185 195	318120 240440 194870	366.5 277 224.5	1328 1007 811
H. 11	2 Rows	3440	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	108 115 120	138240 106560 88320	144 111 92	576 444 368	118.5 126.5 133	172140 132490 122880	184.5 142 117.5	719 552 457	137.5 149.5 158.5	239570 184020 152770	276 212 176	1000 769 636
		3200	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	125 134 139.5	183840 139200 112320	191.5 145 117	765 580 469	139 150.5 158	228590 172610 139950	245 185 150	955 721 584	168.5 185 195	318120 240440 194870	366.5 277 224.5	1328 1007 811
H. 12	3 Rows	3440	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	108 115 120	138240 106560 88320	144 111 92	576 444 368	118.5 126.5 133	172140 132490 122880	184.5 142 117.5	719 552 457	137.5 149.5 158.5	239570 184020 152770	276 212 176	1000 769 636
		3200	●1750	$\frac{1}{4}$ $\frac{1}{6}$ $\frac{1}{10}$	125 134 139.5	183840 139200 112320	191.5 145 117	765 580 469	139 150.5 158	228590 172610 139950	245 185 150	955 721 584	168.5 185 195	318120 240440 194870	366.5 277 224.5	1328 1007 811

No. 18 Massachusetts Type "H" Unit Heaters—Continued

Entering Air Temp.	HEATER	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condensation lbs per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condensation lbs per hour	Equiv. Rad. sq. ft.			
Number of tubes deep															
2 Rows	3440	● 1750 1150	14 16	89 96.5 102	147930 11390 94090	152.5 117 97	616 473 392	97° 104 110.5	171840 131850 109480	180.5 138.5 115	716 550 457	115 127 136.5	241380 185060 153770	270 207 172	1003 770 640
	2260	860	16.0	102											
3 Rows	3200	● 1750 1150	14 16	107.5 117 122.5	195940 148900 120280	202.5 153.5 124.5	819 620 501	117 128 134.5	228480 172790 139940	240 181.5 147	952 721 584	146 162 172.5	320500 242720 197570	358.5 271.5 221	1333 1005 820
	2100	860	16.0	102											
F. 0	3440	● 1750 1150	14 16	93.5 101 106	161280 123840 102720	168 129 107	671 515 427	102.5 112.5 120	195930 150210 125020	210 161 134	816 626 521	123 136 145.5	265610 203980 169260	306 235 195	1106 850 706
	2260	860	16.0	102											
2 Rows	3200	● 1750 1150	14 16	112.5 123 129.5	214080 162240 131520	223 169 137	897 675 548	127 139.5 147	260310 197330 160000	279 211.5 171.5	1086 824 666	157 175 186	352840 267340 216570	406.5 308 249.5	1472 1113 903
	2100	860	16.0	102											
F. 0	3440	● 1750 1150	14 16	74 82 88.5	170720 131440 108640	176 135.5 112	549 454 454	81 90 97	194210 149460 123760	204 157 130	810 623 515	100 112.5 122.5	265070 204730 169000	296.5 229 189	1103 850 705
	2260	860	16.0	102											
3 Rows	3200	● 1750 1150	14 16	94.5 105 112.5	226980 171690 140170	234 177 144.5	948 717 585	104 116.5 124.5	258470 195160 159460	271.5 205 167.5	1079 815 664	132.5 150 162.5	352940 267310 218140	394 299 244	1469 1113 905
	2100	860	16.0	102											
F. 0	3440	● 1750 1150	14 16	78.5 86.5 93	184320 142080 117600	192 148 122.5	769 591 489	88.5 98 105.5	218790 168410 139480	234.5 180.5 149.5	914 703 581	107 121.5 132.5	290350 233940 185320	334.5 258 213.5	1103 850 705
	2260	860	16.0	102											
2 Rows	3200	● 1750 1150	14 16	99.5 111 119	244800 185280 151200	255 193 157.5	1020 773 628	114 128 138	291100 220190 179600	312 236 192.5	1212 921 750	143 162.5 176.5	386260 29650 237830	445 336 274	1610 1214 992
	2100	860	16.0	102											
F. 0	3440	● 1750 1150	14 16	50 60 66.5	204670 158110 130470	211 163 134.5	855 658 544	56 67 74	226580 174220 143750	238 183 151	942 726 600	75 88.5 98	295020 227520 188190	330 254.5 210.5	1230 945 783
	2260	860	16.0	102											
3 Rows	3200	● 1750 1150	14 16	74.5 86.5 95	273060 205640 168300	281.5 212 173.5	1132 860 702	82.5 96 105.5	300830 226580 186120	316 238 195.5	1250 946 776	109.5 128.5 141.5	392910 296810 243170	439.5 332 272	1633 1237 1011
	2100	860	16.0	102											
F. 0	3440	● 1750 1150	14 16	54.5 64.5 71.5	218880 168480 139200	228 175.5 145	911 700 579	63 74.5 83	250980 193130 160000	269 207 171.5	1047 807 666	75 88.5 107	317690 244780 202240	366 282 233	1328 1020 845
	2260	860	16.0	102											
2 Rows	3200	● 1750 1150	14 16	79 92.5 102	289920 219840 180000	302 229 187.5	1208 916 747	92 107 119	333080 251910 206660	357 270 221.5	1391 1050 863	119 138.5 154	421850 319420 261700	486 368 301.5	1760 1335 1091
	2100	860	16.0	102											

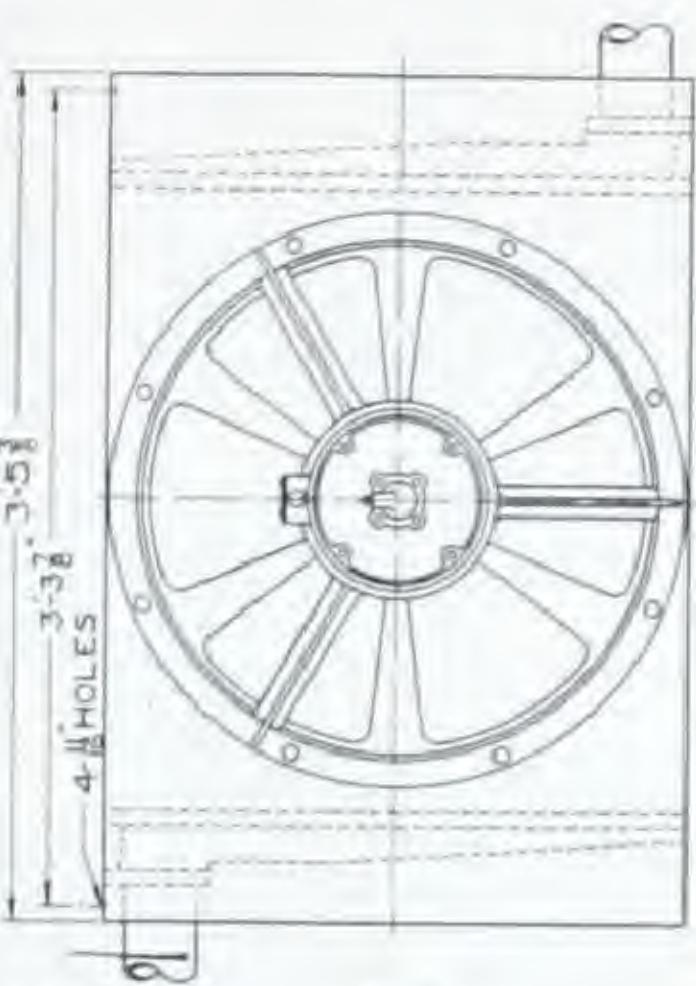
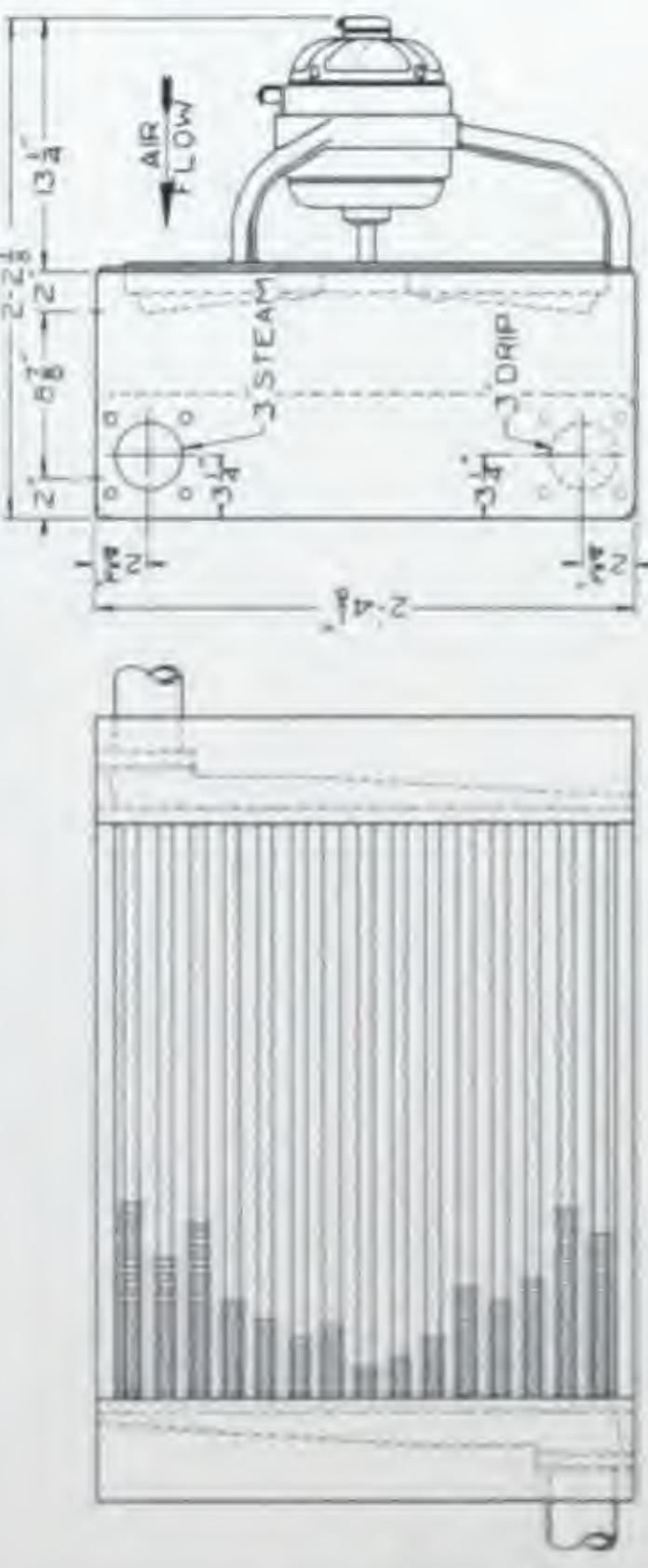
C. F. M.—The cubic feet of air per minute rating in the above tables represents the total quantity of air handled by the fans at the entering air temperature.

R. P. M. The speeds shown correspond to full load R. P. M. of commercial direct current and 60 cycle alternating current motors.

● The 1750 R. P. M. units should not be used on installations where practically silent operation is required.

EQUIVALENT RADIATION—The equivalent square foot of direct cast iron column radiator is based on a heat emission of 240 B. T. U. per hour per foot square of direct radiation.

No. 24 MASSACHUSETTS TYPE "H" UNIT HEATERS



SPECIFICATIONS

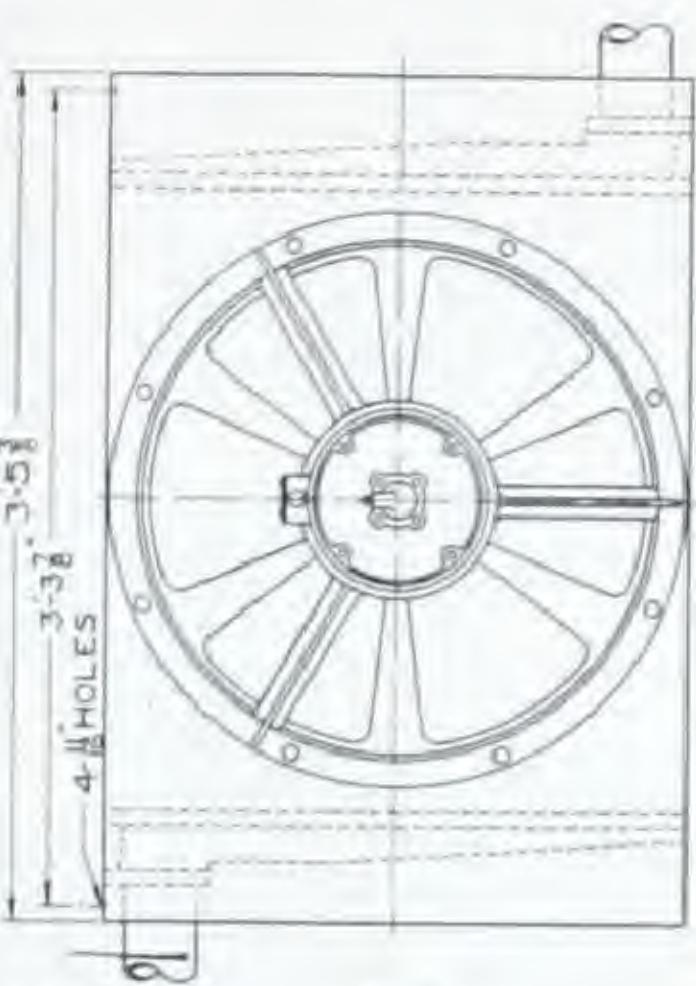
FAN.—24" Design 5 Massachusetts Electric Propeller Fan.

MOTOR.—Totally enclosed, round frame, ball bearing motors. Single phase units furnished with condenser type motors.

HEATER.—No. 31 High Pressure B. & B. Heater Sections— $\frac{3}{4}$ " copper tubes and $1\frac{1}{2}$ " copper fins, all tinmed; the former welded into drilled holes in the brass tube sheets. Headers of close grained cast iron.

All heaters are designed for 125 pounds steam working pressure, and are tested at 250 pounds hydrostatic pressure.

Linear feet of tubing:—2 row—75 feet;
3 row—114 feet.



RETURN END ELEVATION

INLET SIDE ELEVATION

Entering Air Temp. °F.	HEATER Number of tubes deep	C. F. M. R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condens- ation lbs.perhour	Equiv. Rad. sq.ft.	Final Temp. °F.	B. T. U. per hour	Condens- ation lbs.perhour	Equiv. Rad. sq.ft.
70	2 Rows	4950 3650	• 1150 860	12 106.5	170470 141770	176 146	710 590	109 114	203210 169000	213.5 177.5	846 705
	3 Rows	4200 3100	• 1150 860	12 119.5 125	217440 178300	224 184	906 744	129.5 136	239200 212540	272 223	1080 886
70	2 Rows	4950 3650	• 1150 860	12 106 110.5	188160 156480	196 163	78.5 65.2	115 121	234250 194820	251 209	975 813
	3 Rows	4200 3100	• 1150 860	12 125 131	240000 196800	250 205	1000 820	139 147	298800 245020	320.5 262.5	1248 1020
70	2 Rows	4950 3650	• 1150 860	12 95 99.5	185610 153650	191.5 158.5	773 640	101 106.5	218780 181120	229.5 190	913 755
	3 Rows	4200 3100	• 1150 860	12 113.5 119.5	236390 194370	243.5 200.5	986 810	123 130.5	278640 229100	292.5 240.5	1160 955
99	2 Rows	4950 3650	• 1150 860	12 98.5 103.5	203520 168480	212 175.5	848 702	107.5 113.5	250330 207230	268.5 222	1041 863
	3 Rows	4200 3100	• 1150 860	12 118.5 127	259200 213120	270 222	1090 887	132.5 141.5	318820 262140	341.5 281	1330 1090
99	2 Rows	4950 3650	• 1150 860	12 98.5 103.5	203520 168480	212 175.5	848 702	107.5 113.5	250330 207230	268.5 222	1041 863
	3 Rows	4200 3100	• 1150 860	12 118.5 127	259200 213120	270 222	1090 887	132.5 141.5	318820 262140	341.5 281	1330 1090

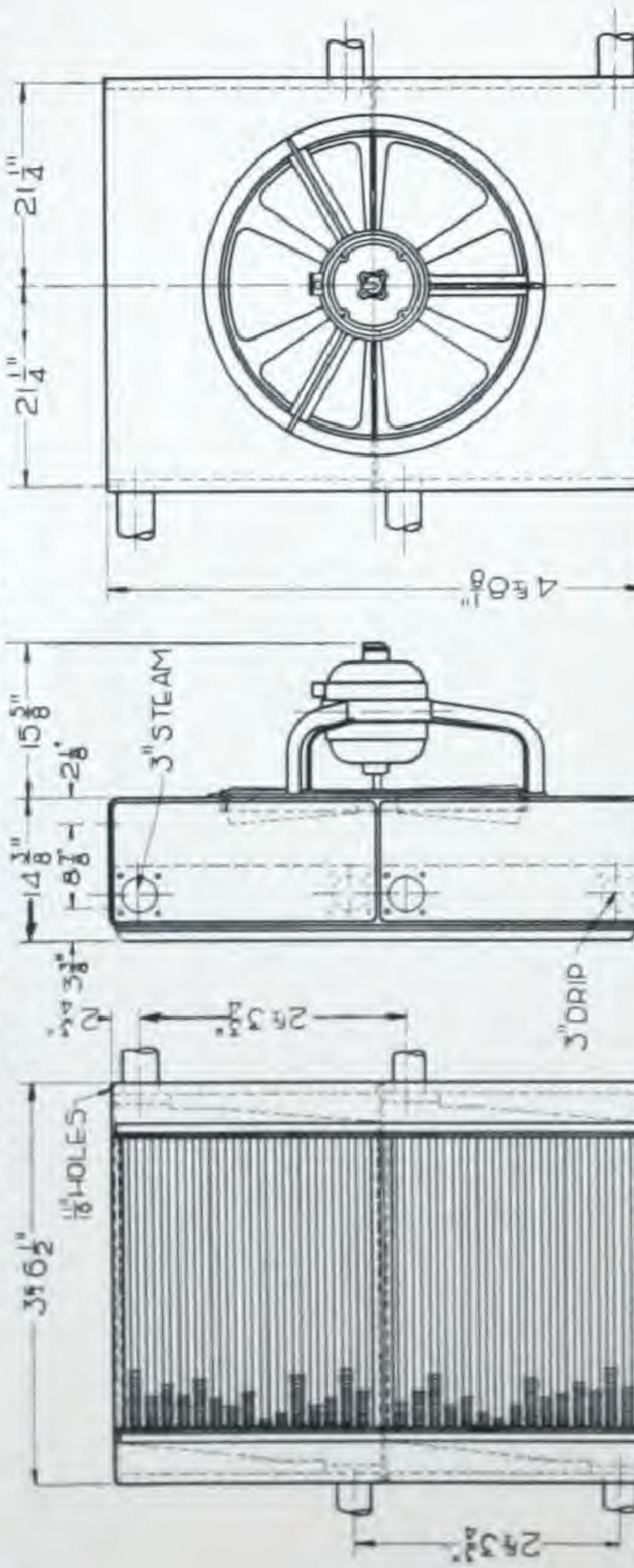
No. 24 Massachusetts Type "H" Unit Heaters—Continued

C. F. M.—The cubic feet of air per minute rating in the above tables represents the total quantity of air handled by the fans at the entering air temperature.

- The 1150 R. P. M. units should not be used on installations where practically silent operation is required.

EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column radiator is based on a heat emission of 240 B. T. U. per hour per square foot of direct radiation.

No. 30 MASSACHUSETTS TYPE "H" UNIT HEATERS



SPECIFICATIONS

FAN:—30" design 5 Massachusetts Electric Propeller Fan.

MOTOR:—Totally enclosed, round frame, ball bearing motors. Single Phase units furnished with condenser type motors.

HEATER:—2 sections of No. 37 High Pressure B. & B. Heater Sections— $\frac{3}{4}$ " copper tubes and $1\frac{1}{2}$ " copper fins, all tinned, the former welded into drilled holes in the brass tube sheets. Headers of close grained cast iron.

All heaters are designed for 125 pounds steam working pressure, and are tested at 250 pounds hydrostatic pressure.

Linear feet of tubing.—2 row—180 feet.
3 row—272 feet.

DISCHARGE SIDE ELEVATION RETURN END ELEVATION INLET SIDE ELEVATION

Entering Air Temp.	HEATER Number of tubes	C. F. M.	R. P. M.	H. P.	Final Temp. °F.	B. T. U. per hour	Condens- ation lbs.per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condens- ation lbs.per hour	Equiv. Rad. sq. ft.	Final Temp. °F.	B. T. U. per hour	Condens- ation lbs.per hour	Equiv. Rad. sq. ft.
2 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	1 $\frac{1}{2}$ $\frac{1}{4}$	107 110	259960 226980	268 234	1082 946	115 118.5	312730 273220	328.5 287	1300 1138	135 140	446110 388890	499 435	1860 1622
3 Rows	6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	1 $\frac{1}{2}$ $\frac{1}{4}$	123 128	338530 297790	349 307	1410 1238	134.5 140.5	407460 358900	428 377	1700 1495	164.5 173	581100 511370	630 572	2420 2130
4 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	1 $\frac{1}{2}$ $\frac{1}{4}$	111 114.5	286560 250560	298.5 261	1193 1043	121.5 125.5	356870 312090	382.5 334.5	1488 1300	143 148.5	495630 434000	571 500	2065 1810
5 Rows	6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	1 $\frac{1}{2}$ $\frac{1}{4}$	129 133	373440 328800	389 342.5	1555 1370	144.5 150	465570 410050	499 439.5	1945 1708	176 186.5	646660 568540	745 655	2695 2365
6 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	1 $\frac{1}{2}$ $\frac{1}{4}$	100 102.5	283730 247350	292.5 255	1182 1030	107.5 110.5	334150 291310	351 306	1392 1213	128 133	474270 413920	530.5 463	1975 1720
7 Rows	6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	1 $\frac{1}{2}$ $\frac{1}{4}$	117.5 122	369090 323980	380.5 334	1538 1350	128 134	434110 380800	456 400	1809 1585	158.5 167.5	616860 541760	690 606	2565 2255
8 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	1 $\frac{1}{2}$ $\frac{1}{4}$	104 107.5	311040 271200	324 282.5	1295 1130	114.5 121	382530 345210	410 370	1596 1438	135 142	526000 458300	606 528	2195 1910
9 Rows	6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	1 $\frac{1}{2}$ $\frac{1}{4}$	123 128.5	404640 355200	421.5 370	1685 1480	138.5 145.5	497290 437580	533 469	2070 1822	171 181	684850 600656	789 692	2850 2503

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No. 30 Massachusetts Type "H" Unit Heaters—Continued

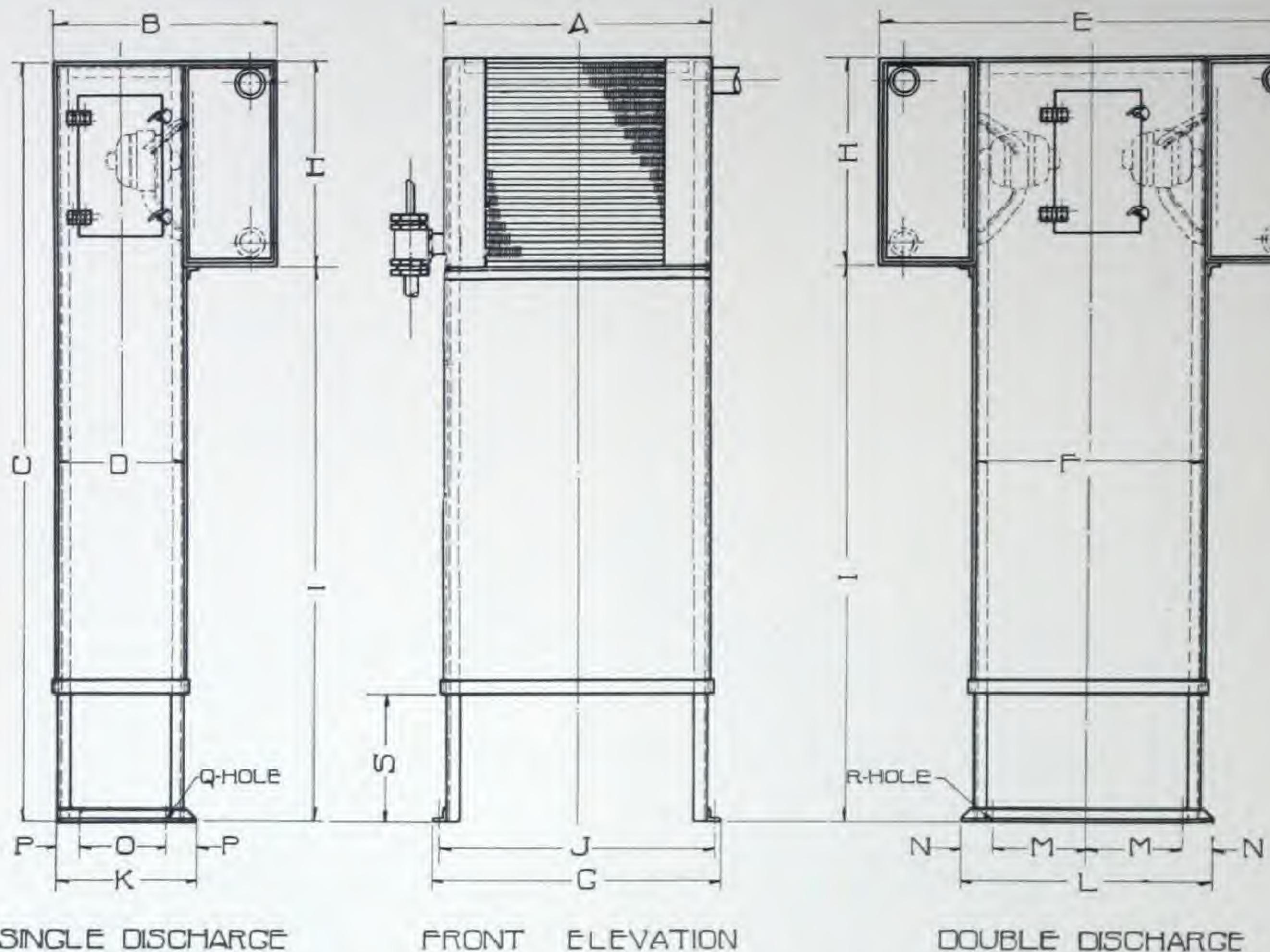
Enter- ing Air Temp.	HEATER Number of tubes	C. F. M.	R. P. M.	H. P.	Final Temp. F°	B. T. U. per hour	Condens- ation lbs.per hour	Equiv. Rad. sq. ft.	Final Temp. °F	B. T. U. per hour	Condens- ation lbs.per hour	Equiv. Rad. sq. ft.	Final Temp. °F	B. T. U. per hour	Condens- ation lbs.per hour	Equiv. Rad. sq. ft.
110° 05	2 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	92.5 96	306520 267720	316 276	1275 1115	99.5 104	356050 311300	374 327	1485 1295	120.5 126.5	498850 436270	558 488	2075 1815
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	111.5 117	402550 352600	415 363.5	1678 1470	122.5 128.5	466960 409360	490.5 430	1948 1705	154 165	656200 581950	734 641	2735 2420
110° 05	3 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	96.5 100	333600 291840	347.5 304	1389 1215	107 111	405860 354540	435 380	1690 1475	128 135	551180 481740	635 555	2300 2005
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	117.5 123	438240 384000	456.5 400	1825 1600	133 140.5	532740 466500	571 500	2220 1945	166 176	723910 633640	834 730	3010 2638
110° 05	2 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	77.5 81.5	352600 309430	363.5 319	1468 1289	84.5 89	400790 352240	421 370	1670 1465	105 112	546230 478290	611 536	2275 1990
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	100 105	465600 403520	480 416	1940 1680	109.5 116	528360 460290	555 483.5	2200 1920	141.5 150	721460 625800	807 700	3000 2605
110° 05	3 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	100 105	352600 309430	363.5 319	1468 1289	84.5 89	400790 352240	421 370	1670 1465	105 112	546230 478290	611 536	2275 1990
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	117.5 123	438240 384000	456.5 400	1825 1600	133 140.5	532740 466500	571 500	2220 1945	166 176	723910 633640	834 730	3010 2638
110° 05	2 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	81.5 86	380160 333600	396 347.5	1585 1389	92.5 97.5	452510 397460	485 426	1885 1655	112.5 120.5	508050 524270	689 604	2490 2180
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	105 111	501120 436320	522 454.5	2090 1816	121 127.5	597120 518750	640 556	2490 2160	153 161.5	788140 683980	908 788	3280 2845
110° 05	3 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	81.5 86	380160 333600	396 347.5	1585 1389	92.5 97.5	452510 397460	485 426	1885 1655	112.5 120.5	508050 524270	689 604	2490 2180
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	105 111	501120 436320	522 454.5	2090 1816	121 127.5	597120 518750	640 556	2490 2160	153 161.5	788140 683980	908 788	3280 2845
110° 05	2 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	56.5 61	436020 382180	449.5 394	1815 1592	61 65.5	467430 409840	491 430.5	1947 1705	80 87	608810 533720	681 597	2535 2220
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	83 87.5	579090 499530	597 515	2410 2080	89 95	621660 535980	653 563	2590 2235	119 128	809070 697320	905 780	3370 2900
110° 05	3 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	56.5 61	436020 382180	449.5 394	1815 1592	61 65.5	467430 409840	491 430.5	1947 1705	80 87	608810 533720	681 597	2535 2220
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	83 87.5	579090 499530	597 515	2410 2080	89 95	621660 535980	653 563	2590 2235	119 128	809070 697320	905 780	3370 2900
110° 05	2 Rows	6650 5400	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	58.5 64	451200 395520	470 412	1880 1645	68 73.5	517820 454370	555 487	2158 1890	87 95	656210 576350	756 664	2735 2400
		6100 4950	690 560	1 $\frac{1}{2}$ $\frac{1}{4}$	87 92.5	600000 517920	625 539.5	2500 2155	100 107	689490 593390	739 636	2870 2470	130.5 139.5	876680 753420	1010 868	3650 3135

C. F. M.—The cubic feet of air per minute rating in the above tables represents the total quantity of air handled by the fans at the entering air temperature.

R. P. M.—The speeds shown correspond to full load R. P. M. of commercial direct current and 60 cycle alternating current motors.

EQUIVALENT RADIATION—The equivalent square feet of direct cast iron column radiator is based on a heat emission of 240 B. T. U. per hour per square foot of direct radiation.

MASSACHUSETTS



SINGLE DISCHARGE

FRONT ELEVATION

DOUBLE DISCHARGE

Single and Double Recirculating Boxes For Ceiling Type "H" Unit Heaters

Size	A	B	C	D	E	F	G	H	I	Shipping Weight	
										Single	Double
18	32 $\frac{1}{4}$	31	106	18	57 $\frac{3}{4}$	32	34 $\frac{1}{8}$	28 $\frac{1}{8}$	77 $\frac{7}{8}$	365	415
24	41 $\frac{1}{4}$	31	106	18	57 $\frac{3}{4}$	32	44 $\frac{1}{8}$	28 $\frac{1}{8}$	77 $\frac{7}{8}$	425	495
30	56 $\frac{1}{4}$	38 $\frac{3}{8}$	106	24	68 $\frac{3}{4}$	40	59 $\frac{3}{4}$	56 $\frac{1}{8}$	49 $\frac{7}{8}$	525	625

Size	J	K	L	M	N	O	P	Q	R	S	Shipping Weight	
											Single	Double
18	32 $\frac{1}{8}$	18	32	13	3	13	2 $\frac{1}{2}$	$\frac{9}{16}$	$\frac{9}{16}$	18	365	415
24	41 $\frac{1}{8}$	18	32	13	3	13	2 $\frac{1}{2}$	$\frac{9}{16}$	$\frac{9}{16}$	18	425	495
30	57 $\frac{3}{4}$	24	40	17	3	17	3 $\frac{1}{2}$	$\frac{9}{16}$	$\frac{9}{16}$	18	525	625

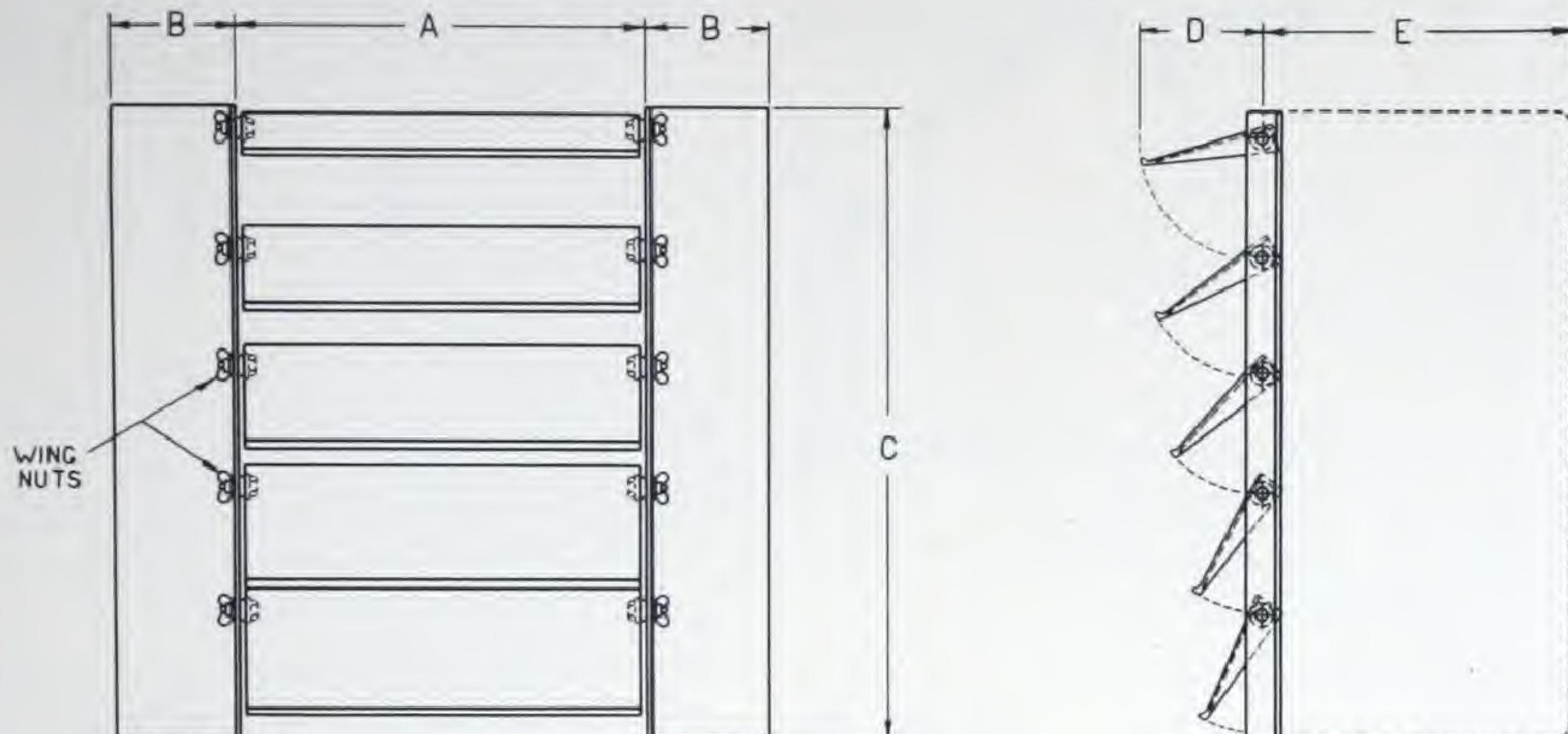
SPECIFICATIONS

Sides, ends, and top, are of 16 gage blue annealed sheets, spot welded to supporting angle legs extending entire length of unit.

Finished to match unit heater with two coats of high grade lacquer.

Damper for mixing fresh and recirculated air can be furnished with all recirculating boxes when required.

MASSACHUSETTS



DEFLECTORS FOR TYPE "H" UNIT HEATERS

DEFLECTORS FOR TYPE "H" UNIT HEATERS

Size of Heater	Number of Vanes	Principal Dimensions—Inches				
		A	B	C	D	E
18	5	22	6	28½	6¼	19⅛"
24	5	31	6	28½	6¼	19⅛"
30	10	37	6	56¾	6¼	19⅛"

SPECIFICATIONS

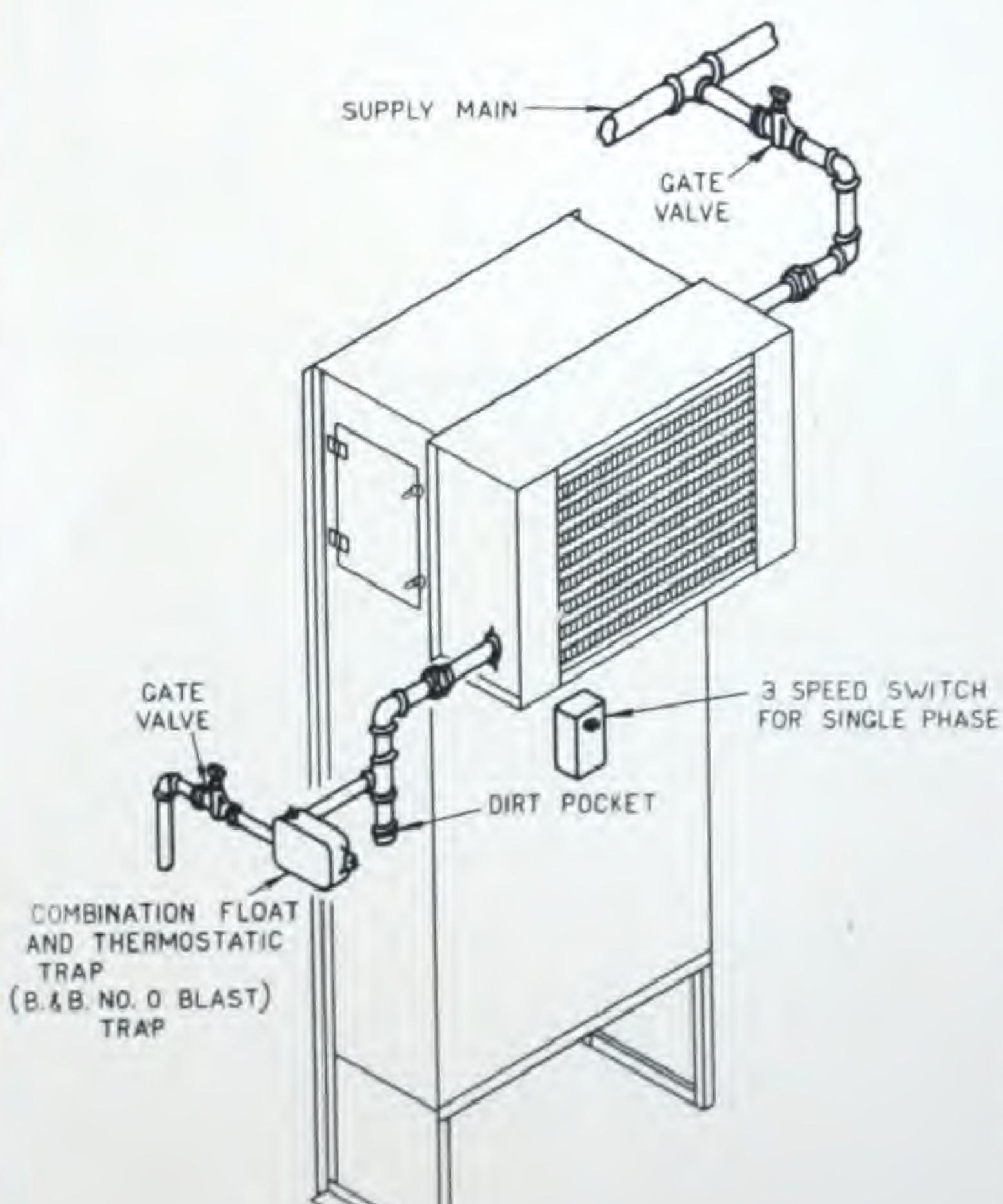
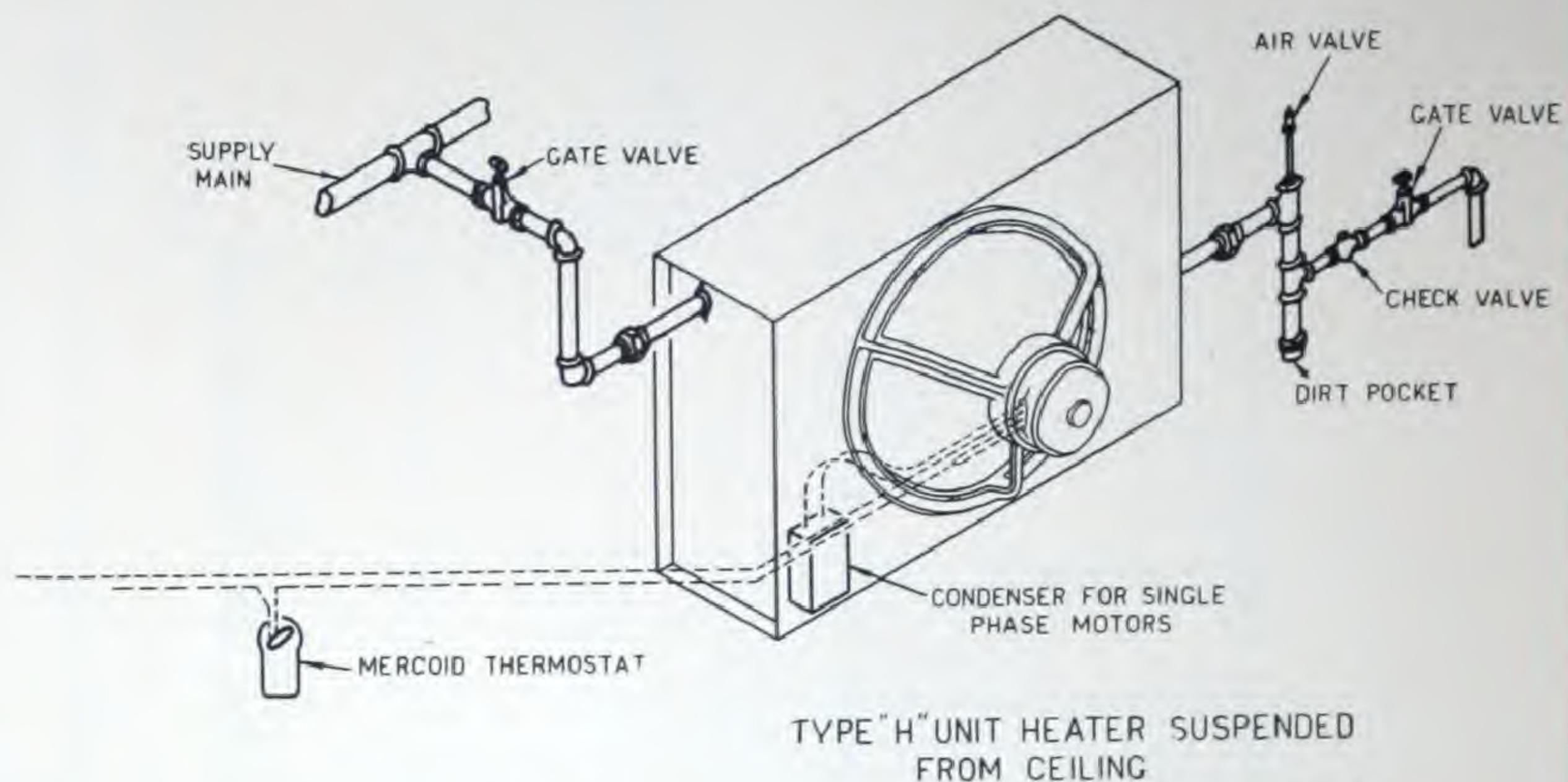
Side plates are integral with heater, of 16 gage steel.

Deflector vanes are adjustable and removable of 20 gage steel.

Finish matches that of unit heater.

MASSACHUSETTS

TYPICAL PIPING AND ELECTRICAL CONNECTIONS FOR MASSACHUSETTS TYPE "H" UNIT HEATERS



TYPE "H" UNIT HEATER WITH RECIRCULATING BOX



Because of the decrease in efficiency in thermostatic traps operated over a wide range of discharge temperatures encountered in connection with the varying steam pressures used for unit heaters, the No. 0 Blast Trap has been designed as a combination thermostatic and float trap to meet widely varying conditions without loss of efficiency.

The No. 0 Blast Trap maintains a continuous flow of condensate from the unit, regardless of temperature of condensate, and quickly evacuates the water of condensation under all conditions, eliminating entirely the possibility of freezing.

The No. 0 Blast Trap is designed primarily for unit heaters, being fitted with a Thermostatic member for the relief of air and a large area port opening controlled by a ball float for the evacuation of condensation.

MASSACHUSETTS



Left: Typical installation of Massachusetts Type H Unit Heaters fitted with recirculating boxes for garage heating



Left: Massachusetts Type H Unit Heaters ceiling suspended type for warehouse heating.



Left: Typical installation of Massachusetts Type H Unit Heater, ceiling suspended type for garage heating.



Typical industrial installation of Massachusetts Type H Unit Heater



Above: Typical installation of Massachusetts Type H Unit Heaters fitted with recirculating boxes for garage heating.

A Few Representative Installations of Massachusetts Unit Heaters

Manufacturing Plants

The Brost Pattern Works Cleveland, O.
The Beaver Mfg. Co. Ballardville, Mass.
Cox Refrigerating Engineering Co.
Indianapolis, Ind.

Long Bell Lumber Co. Oklahoma City, Okla.
Oklahoma Manufacturing Co.
Oklahoma City, Okla.

Franklin County Lumber Co. Greenfield, Mass.
Bridgeport Chair Co. Bridgeport, Conn.
Bullard Machine Tool Co.

Bridgeport, Conn.
Meyer Body Co. Buffalo, N. Y.
Ladish Drop Forge Co. Cudahy, Wis.

The Shelby Cycle Co. Shelby, Ohio
W. E. Aspin Basket Co. Chardon, Ohio
Thomas L. Gatzke Co. Winona Lake, Ind.

The Toy Kraft Co. Wooster, Ohio
N. Klausner & Sons Co. Cleveland, Ohio
Cummins Canning Co. Conneaut, Ohio

Massachusetts Electric Mfg. Co. West Lynn, Mass.
F. C. Hersee Mfg. Co. Watertown, Mass.

George Weston Biscuit Co. Watertown, Mass.
Hardie Manufacturing Co. Hudson, Mich.

General Industries Co. Elvria, Ohio
The Crew Levick Co. Philadelphia, Pa.

The Brown Company "Berlin Mills" Berlin, New Hampshire
The Liquid Carbonic Co. Cleveland, Ohio

The Liquid Carbonic Co. St. Louis, Mo.
The Pittsburgh Plate Glass Co. Crystal City, Mo.

Forest Furniture Co. N. Wilkesboro, N. C.
Chesapeake & Ohio Railway Co. Shops Russell, Kentucky

The Bender Body Co. Cleveland, Ohio
Pemberton Power Co. Boston, Mass.

Dodge Steel Co. Philadelphia, Pa.
Alemite Lubricating Co. Baltimore, Md.

Bellanca Air Craft Corp. Newcastle, Del.
Central Alloy Steel Co. Canton, Ohio

Cleveland Electric Illuminating Co. Ashtabula, Ohio

Garages, Service Stations and Auto Sales Rooms:

The Mittleman Garage Chicago, Ill.
The Cleveland Clinic Garage Cleveland, O.

The Stanton Garage "Ford" Euclid, Ohio
West Towns R. R. Bus Garage Chicago

The White Motor Co. Detroit, Mich.
Main Street Garage Co. Waltham, Mass.

Morrissey Motor Car Co. Bridgeport, Conn.
The Davison Cartage Co. Chicago, Ill.

Woodland Cemetery Garage Detroit, Mich.

Chevrolet Garage Rochester, Mich.
The White Motor Co. Columbus, Ohio

G. A. Mighton Realty Co. Shaker Hts., O.
Consolidated Cartage Co. Cleveland, Ohio

Richard Lydy Garage Chicago, Ill.

Public Buildings:

The Oklahoma State Penitentiary McAlester, Okla.

The Albert Pike Hotel Little Rock, Ark.
American College of Surgeons Chicago, Ill.

Library Bldg. Oklahoma State University Norman, Okla.

Great Neck High School Great Neck, L. I., N. Y.

Girls' Dormitory Wilburton, Okla.

Administration Bldg. Wilburton, Okla.

McDonogh School Baltimore, Md.

Bethany English Lutheran Church Cleveland, Ohio

Miscellaneous Applications:

Maggenti & Dougherty Co. Philadelphia

Samuel Stelke Stamford, Conn.

L. J. Fitzpatrick Southampton, Pa.

Lord, Hawley & Hammell Philadelphia

Chas. A. Thomas Berlin, N. J.

Sol. H. Goldberg Chicago, Ill.

A. H. Riviere Co. Summit, N. J.

Rickley Brothers Philadelphia, Pa.

Kalleh & Scull Co. Philadelphia, Pa.

Joseph Kettman Co. Bridgeport, Conn.

Stephenson Contracting Co. Atlanta, Ga.

Max Kunzman Baltimore, Md.

R. T. Pender, Inc. Lynn, Mass.

J. B. Kennedy Co. Greenfield, Mass.

Krane Engineering Co. Chicago, Ill.

Brooklyn Plumbing Co. Waterbury, Conn.

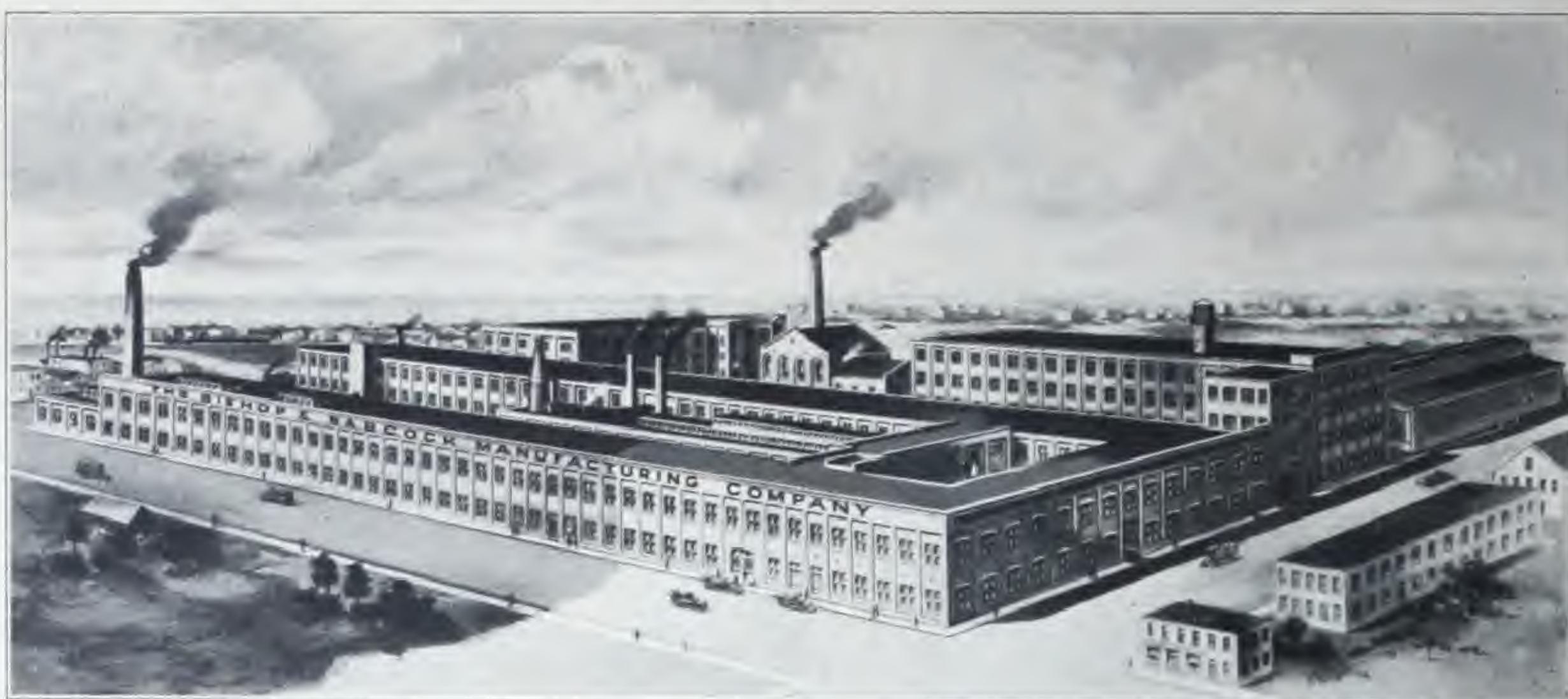
Morris Winnikoff Co. Waterbury, Conn.

E. J. Claffy Chicago, Ill.

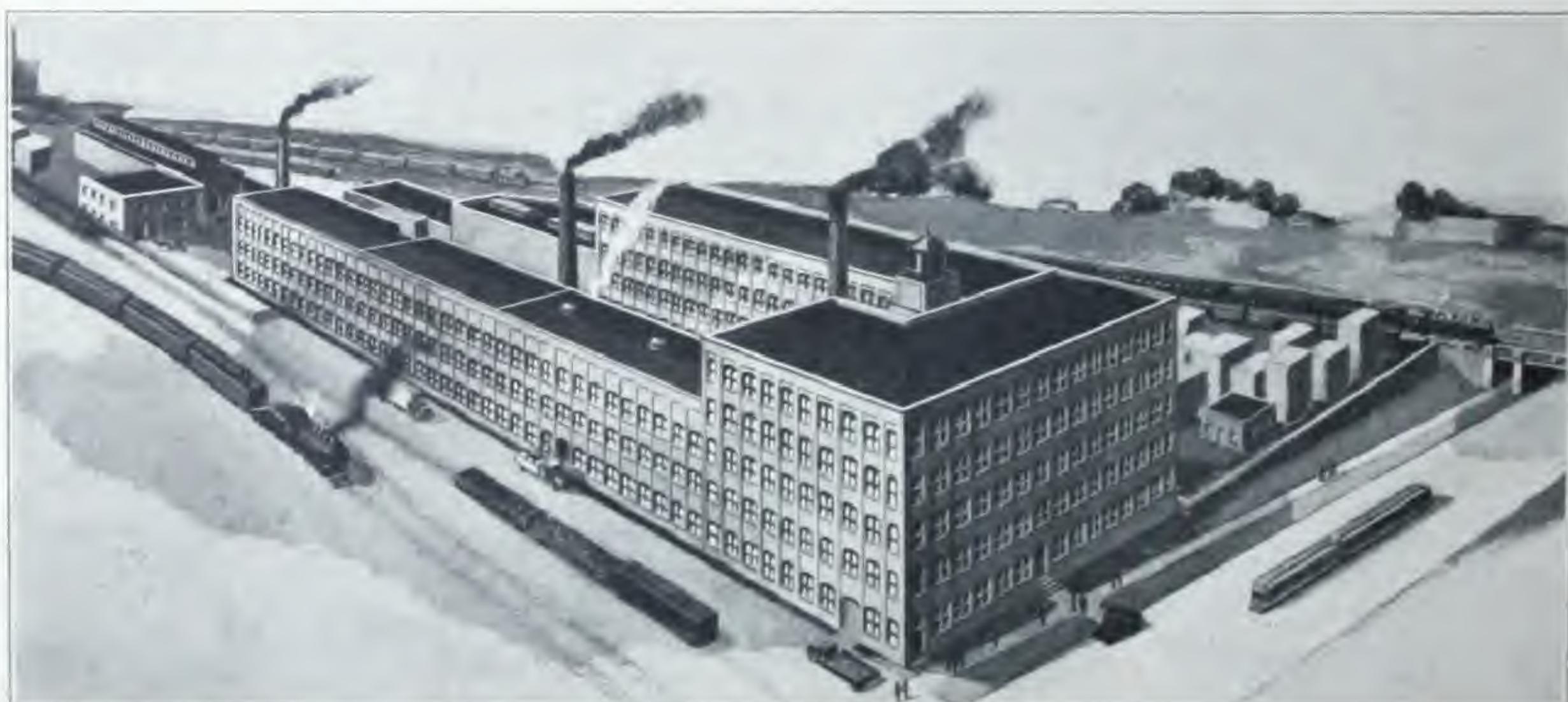
Ben Kahn & Co. Cleveland, Ohio

The B&B Line

MASSACHUSETTS



No. 1 PLANT
4901-4915 HAMILTON AVE., N. E.



No. 2 PLANT
1194-1204 EAST 55th STREET, N. E.

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Cleveland, Ohio

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